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(54) Bottle of thermoplastic material and method for the manufacture and filling of same

(57) The bottle is of a single-piece and comprises a main body (2) with a hermetically closing part (6) delimited by a weakening (7) of the material adjacent to the periphery of the mouth. The bottom part is constituted by a sheet of a thermoplastic material joined to the bottle body by thermowelding. The bottle is closed with a screw-on-cap (8), or a top (12), which are joined to the closing part (6) by means of an adhesive or glue (11).

The method comprises the stages of feeding a thermoplastic laminate to a thermoforming machine; heating the laminate to a predetermined temperature; inserting a preformed punch (17) into a negative mould (18) of the bottle (1), situated in inverted position, with the laminate (16) interposed between the punch and the mould; conforming the body (2) of the bottle by means of pressure or pneumatic vacuum; forming the weakening (7) and the closing part (6) by means of a punch (19); filling the bottle with the product (22) to be contained therein, by the upper opening (20) which will later be the bottom part of the bottle; and thermal weld a laminate (21) of thermoplastic material to the periphery of the said upper opening, determining the bottom part or base and the bottle, being therefore, finished and hermetically sealed.

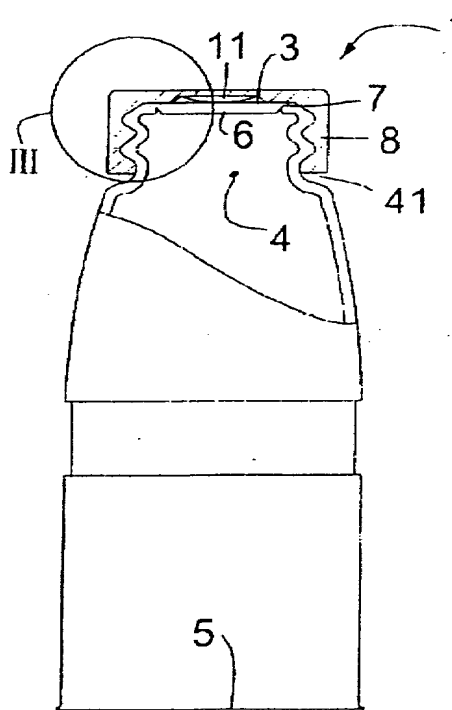


FIG. 2

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Description**Technical sector of the invention.-**

[0001] The present invention refers to a thermoplastic bottle of the type comprising a main body, which is essentially prismatic and moulded in a single-piece, a bottom part or base, and a mouth, as well as a method for the manufacture and filling of same. Likewise, the invention refers to groupings of the previous bottles and to the methods of obtaining such groupings.

State of the Art.-

[0002] At the present time, for the contention of food products, in particular dairy products such as milk, drinkable yogurts, fruit juices or similar, a multiplicity of thermoplastic bottle embodiments are known, which consist of a main body which is essentially prismatic and moulded in a single-piece, a bottom part or base and a mouth.

[0003] Nowadays, these bottles are manufactured conventionally by means of blow moulding methods of a preform formed from extruded grains of a thermoplastic material, conforming the main body of the bottle into a single-piece, with its mouth open by which the bottle is filled in its right-hand position and once the same has been conformed, with the product to be contained therein. Following this operation, the mouth is covered with a cap or complex laminate metalized plastic top, which is joined to the annular edge of the mouth by adhesive or, alternatively, with a screw-on-cap, possibly provided with a hermetic protective seal.

[0004] In practice, many known bottles of this type present an imperfect airtightness, dripping frequently being found around the joining areas between the cap and the mouth.

[0005] Moreover, at present the production of the full and closed definitive container is done according to a discontinuous batch production process, which consists of the extrusion, heating, blow moulding, filling and closing stages. These stages are carried out at different facilities which can be located in remote places, or even in very far-off production plants. The transportation of the bottles from one facility or location to another requires very strict hygienic measures to be adopted, which do not always guarantee the total asepsis of the materials and of the products and which are very costly, raising problems of a logistical nature.

[0006] In order to solve the drawbacks and problems mentioned, the inventors have thought of a new continuous method for this type of bottle, giving rise to bottles of novel concept and design and which entail, in the same way, other additional advantages.

[0007] Basically, the novel procedure is based on the application of the thermoforming technique, which up to the present time, is unknown in the field of the manufacturing technique of bottles of this type.

Explanation of the invention.-

[0008] The object of the present invention is a new bottle of thermoplastic material, of the type mentioned, which essentially is characterized in that it comprises a hermetically sealing portion for the mouth, moulded together with the bottle body forming with the latter a single-piece, said sealing portion being delimited by a weakening of the material which constitutes the bottle, adjacent to the periphery of the mouth and the bottom part or base being constituted by a sheet of thermoplastic material integrally joined by thermowelding to the lower part of the bottle body walls, after the bottle has been filled with the product to be contained therein, all of it adapted so that upon exerting a pulling or pushing force on the sealing portion which is greater than a minimum predetermined effort, the weakening is liable to breaking, either completely or partly, in order to separate the mouth sealing portion, with the aim of achieving the opening of the mouth.

[0009] According to the invention, in the case of the bottles that incorporate a screw-on-cap, which collaborates with a complementary external threading which the bottle neck is fitted with, the top is stuck by its inner face to the outer face of the sealing portion by an adhesive or glue, in such a way that, on unscrewing the top, the breaking of the annular weakening takes place.

[0010] Alternatively, in accordance with the invention, the bottle comprises a cap constituted by a laminate material, joined to the outer face of the sealing portion by an adhesive or glue, in such a way that on pulling the cap manually the complete or partial breaking of the weakening takes place.

[0011] In accordance with another feature of the invention, the weakening has an open arch shape and the cap comprises a pulling and retention tab, in such a way that, once the bottle has been opened by breaking the weakening, the bottle can be closed again by reversion of the opening movement of the closing part so that the cap covers the formed mouth.

[0012] The present invention also has as an object a grouping of bottles of thermoplastic material, which is essentially characterized in that it comprises a plurality of bottles joined without interruption by their bottom part or base by easily-broken joining straps, made of the constituent thermoplastic material itself of the bottom part of the bottles.

[0013] Another object of the present invention is a grouping of bottles of thermoplastic material, which in essence, is characterized in that by comprising a plurality of bottles and a linkage body of the same, the linkage body being constituted by straps of plastic material and at least one handle part, which links the straps to one another in a continuous manner on which multiple orifices of diameter similar to that of the bottle neck are made, provided with notches radially extending on their periphery, providing the edges of the orifices with a certain flexibility, all in such a way that the bottles can be

inserted by pressure in the orifices, remaining held by the effect of the tightening of the edges of the orifices on the bottles' necks.

[0014] The present invention also has as an object, a method of novel concept and function, applicable for the manufacture and filling of bottles and groups of bottles according to that defined in the preceding paragraphs, characterized essentially in that, starting from a sheet of thermoplastic material, it comprises the stages of:

- feeding the sheet of thermoplastic material to a thermoforming machine;
- heating the sheet to a temperature greater than that of the thermofluence of the thermoplastic material;
- inserting a preform punch into a negative mould of the bottle, situated in inverted position, with the sheet interposed between the preform punch and the negative mould;
- conforming the body of the bottle by applying the thermoplastic material against the inner wall of the negative mould, by means of pressure or pneumatic vacuum, and extracting the preform punch from the mould;
- forming the weakening and the sealing portion by splitting of the thermoplastic material by means of a punch;
- filling the bottle with the product to be contained therein by the upper opening which will later be the bottom part or base of the bottle and which remains free because of the withdrawal of the preform punch; and
- thermowelding a sheet of thermoplastic material to the periphery of the aforementioned upper opening, determining the bottom part or base and, the bottle being thus finished and hermetically sealed.

[0015] In accordance with another feature of the method of the present invention, particularly applicable for the manufacture and filling of bottles intended for closing with a screw-on-cap, the method comprises the intermediate stages of applying glue or adhesive between the inner face of the screw-on-cap and the outer face of the sealing portion of the bottle mouth and of subsequently applying the cap to the mouth.

[0016] According to the invention, the stage of applying glue or adhesive and of applying the screw-on-cap can be done simultaneous to the stage of conforming the body of the bottle, for which the cap itself constitutes the bottom part of the negative mould, the threading of the cap forming the surface moulding of the outer threading of the bottle.

Alternatively, the stage of applying glue and applying the screw-on-cap is done immediately after stage of forming the weakening.

[0017] According to another feature of the method of the present invention, the method comprises the intermediate stage of applying, by sticking, a top to the outer face of the closing part.

[0018] In accordance with another feature of the present invention, the method comprises, after the thermowelding stage, the stage of separating by cutting each conformed bottle, filled and closed, from the rest of the sheets of the material which constitute the body and the bottom part of the bottles, respectively.

[0019] In the invention it has been foreseen that, for the manufacture of a first type of groupings of bottles, following the thermowelding stage, the stage of separating by means of cutting, each conformed bottle, filled and closed, done in such a way that the linkage body, which comprises a handle, is obtained from the remainder itself of the sheets of the material that constitutes the body and bottom part of the bottles, respectively.

[0020] In another variation of the method, for the manufacture of a second type of bottle grouping, the former comprises the additional stage of forming the grouping, by means of cutting of the sheets of the material that constitute the body and bottom part of the bottles, respectively.

[0021] Those skilled in the art will observe that, the novel features of the bottles disclosed in the present invention, fully guarantee water-tightness for the protection of their content.

[0022] Moreover, the method of the present invention allows for the manufacture by thermoforming and the filling and final closing of the bottles, in a totally continuous process, which consequently can give rise to modular machines and not so long as the current ones, guaranteeing asepsis in the operations and providing greatly reduced operating costs.

[0023] It will be appreciated that with all of that, the present invention manages to give a satisfactory solution to the technical problem raised.

Brief description of the drawings.-

[0024] Below the description of a form of preferred embodiment is made, although not exclusive, of the object of the present invention, for whose greater understanding some drawings are attached, given merely by way of non-limiting example, in which:

- Fig. 1 is an elevation view of a first form of embodiment of a bottle according to the invention;
- Fig. 2 is an elevation and part cross-section view of the bottle of Fig. 1;
- Fig. 3 is a detailed view, according to III of Fig. 2, which illustrates the bottle in its closed position;
- Fig. 4 is an analogous view to that of Fig. 3, but in which the bottle in its open position is shown;
- Fig. 5 is a view, analogous to that of Fig. 2, of another type of embodiment of the bottle of the invention, partly sectioned at its mouth;
- Fig. 6 is a detailed view, according to VI-VI of Fig. 5, which illustrates the bottle in its closed position;
- Fig. 7 is a view analogous to that of Fig. 6, but in which the bottle is shown in its open position;

Figs. 8 and 9 are both sectional views of another form of embodiment of a bottle according to the invention, which illustrates the particular case in which the bottle comprises a top equipped with a pull and push tab in two different positions; Fig. 10 is a partial section view of a bottle with top according to another embodiment of the invention, which illustrates the open position of same; Fig. 11 is another view of the bottle in Fig. 10, but in which the bottle is in closed position; Fig. 12 is a partial section view of a bottle with screw-on-cap according to another embodiment of the invention, illustrating the open position of same; Fig. 13 is another view of the bottle in Fig. 12, but in which the bottle is to found in closed position; Fig. 14 is a perspective view of another example of a bottle according to the invention, comprising a threaded neck fitted for closing with a screw-on-cap; Fig. 15 is a perspective of another example of a bottle according to the invention, which comprises a hermetically sealing top; Fig. 16 is a perspective view of a first form of embodiment of a grouping of integral bottles according to the invention; Fig. 17 is a perspective view of a second form of embodiment of a grouping of bottles according to the invention, linked by means of a linkage body; Fig. 18 is a partially sectioned diagrammatic view, which shows the stage of conforming the body of a bottle intended for closing using a top, in accordance with the method of the invention; Fig. 19 is a partially sectioned diagrammatic view, which shows the stages of conforming the bottle and simultaneously applying the top to the same, in accordance with the method of the invention; Fig. 20 is a partially sectioned diagrammatic view showing the stages of conforming the body of the bottle intended for closing by means of a screw-on-cap, and simultaneously applying to the same a decorative band, in accordance with the method of the invention; Fig. 21 is a sectioned diagrammatic view, which illustrates the stage of forming the weakening and the sealing part in a bottle intended for closing by means of a cap; Fig. 22 is a sectioned diagrammatic view, analogous to that of Fig. 21, illustrating the stage of forming the weakening and the sealing part in a bottle intended for closing by means of a screw-on-cap; Fig. 23 is a partially sectioned diagrammatic view, which shows the stage of applying the screw-on-cap to a bottle previously conformed with an outer threading on its neck; Fig. 24 is a diagrammatic view showing the simultaneous stages of thermowelding the bottom part or base of a bottle to the body of same, of cutting the sheet into individual bottles and of extracting the

bottles;

Fig. 25 is a diagrammatic view which shows the simultaneous stages of thermowelding the bottom part or base to a group of bottles and of cutting the sheet so that a group of bottles form a single-piece grouping; and

Fig. 26 is a diagrammatic view which illustrates the simultaneous stages of thermowelding the bottom part or base to a group of bottles and of cutting the laminate so that the bottles remain individually separated, determining a waste part to subsequently be used for the linking of the bottles;

Detailed description of the drawings.-

[0025] In the said drawings it can be seen that the bottles 1, 10 of thermoplastic material which are disclosed comprise a main body 2 and essentially prismatic moulded single-piece, a bottom part or base 5 and a mouth 3.

[0026] In Figs. 2 to 14 it is observed that the bottles 1, 10 according to the invention comprise a hermetically sealing portion 6 of the mouth 3, which in the closed and full position of the bottle, as it comes out of the factory, is moulded into a single-piece together with the body 2 of the bottle 1, 10. In order to facilitate the understanding of this explanation, in Fig. 14 an example of bottle 1 has been represented, whose sealing portion 6 has been partly broken.

[0027] The aforementioned sealing portion 6 is delimited, as can be clearly seen in the details of Figs. 3, 4, 6 and 7, by a weakening 7 of the thermoplastic material which constitutes the bottle, made adjacent to the periphery of the mouth 3. The weakening 7 is preferably circumference-shaped, although it can also adopt the shape of other, different curves. In addition, the weakening 7 can be open or closed curve-shaped.

[0028] The bottom part or base 5 of the bottle 1, 10 is formed by a sheet of thermoplastic material, which preferably is the same as that of the rest of the bottle 1, 10, or, in other words, that of the body 2 and the sealing portion 6. The bottom part 5 is integral to the lower part of the walls of the body 2 of the bottle 1, 10 by thermowelding, after the bottle has been filled with the product it is supposed to contain.

[0029] With the numerical reference 1, the embodiments of the bottle provided for closing by means of a screw-on-cap 8, are represented, of which particular illustrative examples are shown in Figs. 1 to 4 and 12 to 14. In this case, the closing by means of the screw-on-cap 6 works with a complementary outer threading 9 with which the neck 4 of the bottle 1 is fitted. The top 8 is stuck by its inner face to the outer face of the sealing portion 6 by means of an adhesive or glue 11.

[0030] Alternatively or complementarily to the top 8 and threading 9, the bottles 1 of the invention can be closed by means of a cap 12 constituted by a sheet material, preferentially of a complex of inert and metalized

plastic, which is joined to the outer face of the sealing portion 6 by like means of an adhesive or glue 11. The embodiments of the bottles equipped with the cap 12 are represented by means of numerical reference 10, and specific examples of them are shown in figs. 5 to 11 and 15.

[0031] The bottle 1, 10 can come from the factory, filled and closed and ready for the consumption of its content, in the hermetically sealed position exemplified in Figs. 2, 3, 5, 9, 11 and 13. In order to open the bottle 1, 10, it is enough to exert upon the sealing portion 6 a pulling or pushing force which is greater than a minimum predetermined effort, with which the weakening 7 breaks totally or partly, unlinking the sealing portion 6 from the mouth 3, resulting in the opening of the latter.

[0032] In particular, in the case of the bottle 1 provided with a screw-on-cap 8 and threading 9, the breaking of the annular weakening 7 takes place on unscrewing the top 8, which in its movement drags the sealing portion 6. This is possible thanks to the fact that the adherence of the cap 8 to the sealing portion 6 is greater than the resistance to the breaking by cutting force of the plastic material part of the weakening 7. The result can be seen in the Figs. 4 and 12.

[0033] In the case of the bottle 10 equipped with top 12, the breaking of the weakening 7 for the opening of the mouth 3 is done by manually pulling the top 12. For this, the top 12 is preferably equipped with a pulling tab 13 or a pulling and retention tab 35, which facilitates the operation. In Figs. 7 and 10 both details are displayed showing the result of this pulling operation.

[0034] In Figs. 8 to 11 embodiment examples of the bottle 10 equipped with top 12 are shown, in which the weakening 7 is in open arc-shape at the ends of which a hinge is determined at the sealing portion 6. In this case, the tab of the top 12 adopts the form of a pulling and retention tab 35, so that, once the bottle 10 is open by breaking of the weakening 7, the former can be closed again, again lowering the sealing portion 6 against the mouth 3 and covering with the top 12 the upper part of the bottle adjoining the mouth 3. In order to facilitate it, the neck 4 of the bottle 10 comprises at its part adjacent to the mouth 3, a split 40 or a similar formation, adapted for housing part of the pulling and retention tab 35 when the latter is tightened manually against the split 40.

[0035] In the examples of the bottles 1 and 10 represented in Figs. 10 to 13 the optional and non-essential feature concurs that, in extension of the neck 4, the bottles 1, 10 comprise a neck 36 which facilitates the exit of the bottle's content. In the case of Figs. 10 and 11, the bottle 10 is of the type that are closed by means of a top 12 equipped with a pulling and retention tab 35, whereas that of Figs. 12 and 13, the bottle 1 is of those intended for closing by means of a screw-on-cap 8.

[0036] In Fig. 16 a group of bottles 1, 10 is shown which are joined in twos at their base through straps 15, which link in a continuous manner with the constituent

material of the bottom part or base 5 of the bottles 1, 10, giving rise to a grouping 14 of bottles. Each of the bottles 1, 10, in this case, six, of the grouping 14, can be separated from the rest by means of breaking the straps 15, for which the width of the strap 15 is small enough to facilitate its breaking.

[0037] In Fig. 17 another alternative form of the grouping 37 of a plurality of bottles 1, 10, is shown, in this case six, too, in accordance with the invention. In this alternative form of grouping 37, the bottles 1, 10 are removably joined by means of a linkage body 24, constituted by two straps 38 of plastic material and a handle part 26, in this example in arched shape or in "half cannon", which link in a continuous manner to the straps 38. In the straps 38 holes 39 are made, one for each bottle 1, 10, of similar diameters, although somewhat smaller than that of a minimum diameter part 41 of the bottle 1, 10 in the adjacent area to the neck 4 (see Figs. 1 to 9). These minimum diameter parts 41 can be constituted by a hollow made in the body 2 or neck 4 of the bottle, or even at the lower edge of a screw-on-cap 8, such as in the case illustrated in Fig. 17.

[0038] At its periphery each orifice 39 is provided with four notches 25 extending radially, which provides the orifice edge with a certain flexibility or spring effect. The bottles 1, 10 are inserted through their neck 4, under pressure in the orifices 39, the notches 25 facilitating the insertion and remaining held by the effect of the tightening of the edges of the orifices 39 on the minimum diameter part 41 of the bottles 1, 10.

[0039] Figs. 18 to 26 show different stages of the method, peculiar to the invention, of the filling and closing of the bottles 1, 10 and formation of the groupings 14, 37.

[0040] Said method consists of the treatment of a sheet 16 of thermoplastic material, by means of the sequential phases which are shown below:

- feeding the sheet 16 of thermoplastic material to a thermoforming machine;
- heating the sheet 16 to a temperature greater than that of the thermofluence of the thermoplastic material;
- inserting a preform punch 17 into a negative mould 18 of the bottle 1, 10, situated in inverted position, with the sheet 16 of thermoplastic material interposed between the preform punch 17 and the negative mould 18 (Figs. 18, 19, 20 and 23);
- conforming the body 2 of the bottle 1, 10 by applying the thermoplastic material against the inner wall of the negative mould 18, by means of pressure or pneumatic vacuum, and extracting the preform punch 17 from the mould 18;
- forming the weakening 7 and the sealing portion 6 by splitting the thermoplastic material by means of a punch 19 (Figs. 21 and 22). The punch 19 has the shape adapted to the desired conformation of the weakening 7: if this is annular, the punch 19 will be

annular, whereas if it is open-arched, the punch will consequently be open-arched.

- filling the bottle 1, 10 with the product 22 to be contained therein, by the upper opening 20 which will then be the bottom part or base 5 of the bottle and which remains free by the withdrawal of the preform punch 17; and
- thermowelding a sheet of thermoplastic material to the periphery of the aforementioned upper opening 20, the bottom part or base 5 remaining determined and, therefore, the bottle 1, 10 finished and hermetically sealed (Figs. 24, 25 and 26).

[0041] In brief, Fig. 18 shows the stage in which the thermoplastic material is applied against the inner wall of the negative mould 18, under pressure or pneumatic vacuum.

[0042] When the bottle 1 is of the type which is closed by means of screw-on-cap 8, the method comprises the stage of applying glue or adhesive 11 between the inner face of the screw-on-cap 8 and the outer face of the sealing portion 6 of the mouth 3 of the bottle 1 and of subsequently applying the cap 8 to the mouth 3.

[0043] The applying of glue or adhesive 11 and of the cap 8 can be done simultaneous to the phase of conforming the body 2 of the bottle 1 (Fig. 23). In order to do this, the mould 18 is divided in two halves 33 and 34, of which a lower movable half 34 receives, in a separated position from the upper half 33 and into a slot 42 for which purpose it is equipped, to the cap 8, after which it is situated in continuity with the upper half 33, in such a way that cap 8 itself constitutes the bottom part of the whole of the negative mould 18. Thus, on carrying out the blowing or aspiration on the mould 18, the threading of the top 8 then goes on to constitute the surface mould for the outer threading 9 of the bottle 1.

[0044] Alternatively, the stage of applying glue 11 and applying the top 8 is carried out immediately after the stage of forming the weakening 7.

[0045] When the bottle 10 is intended for receiving a top 12, the method comprises the intermediate stage of applying by sticking, the top 12, to the outer face of the sealing portion 6. This stage of application of the top 12 can be simultaneous to the blowing or aspiration stage. This latter case is that represented in Fig. 19, where it shows that cap 12 is formed by cutting by means of a clipping 46 from a sheet 47 of a suitable material and next going on to constitute the bottom part of the negative mould 18 of the bottle 10.

[0046] For the formation of individual bottles 1, 10, after the stage of thermowelding the sheet 21 to the periphery of the upper opening 20 for the formation of the bottom part or base 5, whether they are bottles provided with tops 12 or screw-on-cap 8, the sheets 16 and 21 are subject to a simultaneous cutting operation by the action of a die-cutter 44 in which each conformed, filled and closed bottle 1, 10 becomes independent from the rest of the sheets 16, 21 of the material which constitutes

the body 2 and the bottom part 5 of the bottles 1, 10, respectively. In Fig. 24 an example of such simultaneous operation is shown, applied in this case to bottles 10 with top 12, in which the same are expelled from the line by an exit duct 43.

[0047] Fig. 25 shows the mode of forming the bottle groupings 14 of Fig. 16. In this case, the die-cutter 44 has the right configuration to separate a cutting from the sheets 16 and 21 in such a way that the bottles, of which there are six in the case illustrated, are linked by straps 15 which are joined to the bottom parts 5 of the bottles 1, 10.

[0048] Fig. 26 shows the conformation of the linkage body 24 for the formation of the bottle groupings 37 of Fig. 17. In the example shown, the stage of separating by means of cutting each conformed, filled and closed bottle 1, 10 is done so that the aforementioned linkage body 24 is determined directly in the cutting operation itself, starting from the excess sheets 16, 21 which have not gone on to form part of the main body 2 or bottom part 5 of the bottles.

[0049] Alternatively, the cutting stage for the separation of the bottles individually can give rise to a different cutting from the one shown, so that the linkage body 24 would finish by means of a cutting operation or subsequent punching out.

[0050] The handle 26 can be subsequently conformed in a final operation, for example by punching out with rollers in order to give it the desired shape.

[0051] A person skilled in the art will see that, as well as efficiently solving the technical problem of the present invention, the stages of the method being made known can be performed in modular stations, easily interchangeable for the manufacture and filling of bottles 1, 10 of any closing and setting mode. In this way, the manufacture of all types of bottles 1, 10, can be done on a single machine, just by carrying out a few, easy assembling and disassembling operations of the modular stations involved in each case.

[0052] Having sufficiently described the nature of the present invention, as well as the way of putting it into practice, it is hereby stated that everything that does not alter or modify its fundamental principle may be subject to variations in detail.

[0053] In this sense, the method of the invention is liable to incorporate additional stages, such as, for example, the application of a decorative band 31 to the bottle 1, 10 (Fig. 20). Fig. 20 shows the example in which the application of the decorative band 31 is done simultaneously to the conformation stage of the body 2, of the bottle 1, fitted with threading 9. For that, the negative mould 18 is a mould divided in two halves 28, 29, of which the lower half 29 that houses the negative of the threading 9, can be lowered to a position in which it receives the decorative band 31 in its interior, formed by cutting by means of knife 32 starting from a roller 30, which can be printed.

[0054] Likewise, the bottles 1, 10 can adopt different

forms from the ones explained and illustrated by way of example and features which are technical equivalents of the ones claimed.

[0055] The main point, and for which an patent for invention is being applied for, for twenty years, is that which is commented on in the following claims.

Claims

1. Bottle (1, 10) of thermoplastic material, of the type comprising a main body (2) and which is essentially prismatic and moulded in a single-piece, a bottom part or base (5) and a mouth (3), **characterized in that** it comprises a hermetically sealing portion (6) at the mouth, moulded together with the bottle body forming with the latter a single-piece, said closing part being delimited by a weakening (7) of the material which constitutes the bottle, adjacent to the periphery of the mouth and the bottom part or base being constituted by a sheet of thermoplastic material integrally joined by thermowelding to the lower part of the bottle body walls, after the bottle has been filled with the product to be contained therein, all of it adopted so that on exerting pulling or pushing force on the sealing portion which is greater than a minimum predetermined effort, the weakening is liable to breaking, either completely or partly, in order to separate the mouth sealing portion, with the aim of achieving the opening of the mouth.
2. Bottle (1) in accordance with claim 1, **characterized in that**, being of the type comprising a screw-on-cap (8), which works with a complementary outer threading (9) which the bottle neck is fitted with, the top is stuck by its inner face to the outer face of the sealing portion (6) by means of an adhesive or glue (11), in such a way that, on unscrewing the cap, the breaking of the annular weakening (7) takes place.
3. Bottle (10) in accordance with claim 1, **characterized in that** it comprises a top (12) constituted by a laminate material, joined to the outer face of the sealing portion (6) by means of an adhesive or glue (11), in such a way that on pulling the top manually the complete or partial breaking of the weakening (7) takes place.
4. Bottle (10) in accordance with the claim 3, **characterized in that** the weakening (7) has an open-arch shape and the top (12) comprises a pulling and retention tab (35), in such a way that, once the bottle has been opened by the weakening, the bottle can be closed again by reversion of the opening movement of the sealing portion (6) so that the top covers the formed mouth (3).
5. Grouping (14) of bottles in accordance with the previous claims, **characterized in that** it comprises a plurality of bottles (1, 10) linked in a continuous way by their bottom-part or base (5) by easily-broken straps (15), made of the constituent thermoplastic material itself of the bottom part of the bottles.
6. Grouping (37) of bottles in accordance with claims 1 to 4, **characterized in that** it comprises a plurality of bottles (1, 10) and a linkage body (24) of the same, the linkage body being constituted by straps (38) of plastic material and at least one handle part (26), which links the straps to one another in a continuous manner on which multiple orifices (39) of diameter similar to that of the bottle neck are made, provided with notches (25) radially extending on their periphery, providing the edges with a certain flexibility, all in such a way that the bottles can be inserted by pressure in the orifices, remaining held by the effect of the tightening of the edges of the orifices on the bottles' necks.
7. Method for the manufacture and filling of a bottle (1, 10) or group (14, 37) of bottles in accordance with the previous claims, **characterized in that**, starting from a sheet (16) of thermoplastic material, it comprises the stages of:
 - feeding the sheet of thermoplastic material to a thermoforming machine;
 - heating the sheet to a temperature greater than that of the thermofluence of the thermoplastic material;
 - inserting a preform punch (17) into a negative mould (18) of the bottle (1), situated in inverted position, with the sheet (16) interposed between the preform punch and the negative mould;
 - conforming the body (2) of the bottle by applying the thermoplastic material against the inner wall of the negative mould, by means of pressure or pneumatic vacuum, and extracting the preform punch from the mould;
 - forming the weakening (7) and the sealing portion (6) by splitting of the thermoplastic material by means of a punch (19);
 - filling the bottle with the product (22) to be contained therein, by the upper opening (20) which will later be the bottom part or base (5) of the bottle and which remains free because of the withdrawal of the preform punch; and
 - thermowelding a sheet (21) of thermoplastic material to the periphery of the aforementioned upper opening, determining the bottom part or base and, the bottle being thus finished and hermetically sealed.
8. Method in accordance with claim 7, applicable to

the bottle (1) in accordance with claims 1 or 2, **characterized in that** it comprises the intermediate stages of applying glue or adhesive (11) between the inner face of the screw-on-cap (8) and the outer face of the sealing portion (6) of the bottle mouth (3) and of subsequently applying the cap to the mouth. 5

9. Method in accordance with claim 8, **characterized in that** the stage of applying glue or adhesive and of applying the cap (8) is done simultaneously to the stage of conforming the body (2) of the bottle (1), for which the cap itself constitutes the bottom part of the negative mould (18), the threading of the cap forming the surface moulding of the outer threading (9) of the bottle. 10 15

10. Method in accordance with claim 8, **characterized in that** the stage of applying glue and applying the screw-on-cap (8) is done immediately after the stage of forming the weakening (7). 20

11. Method in accordance with claim 7, applicable to the bottle (10) in accordance with claims 1 or 3, **characterized in that** it comprises the intermediate stage of applying, by sticking, the top (12) to the outer face of the sealing portion (6). 25

12. Method according to any of the previous claims, **characterized in that**, after the thermowelding stage, it comprises the stage of separating by cutting, each conformed bottle (1, 10), filled and closed, from the rest of the sheets (16, 21) of the material which constitute the body (2) and the bottom part (5) of the bottles, respectively. 30 35

13. Method in accordance with claim 12, particularly applicable for the manufacture of the grouping (37) of bottles (1, 10) in accordance with claim 6, **characterized in that** the stage of separating by means of cutting each conformed bottle (1, 10), filled and closed, done in such a way that the linkage body (24), which comprises a handle (26) is obtained from the remainder itself of the sheets (16, 21) of the material that constitutes the body (2) and the bottom part (5) of the bottles, respectively. 40 45

14. Method in accordance the claims 7 to 11, particularly applicable for the manufacture of the grouping (14) of bottles (1, 10) in accordance with claim 5, **characterized in that** it comprises the additional stage of forming the grouping, by means of the cutting of the sheets (16, 21) of the material that constitute the body (2) and the bottom part (5) of the bottles, respectively. 50 55

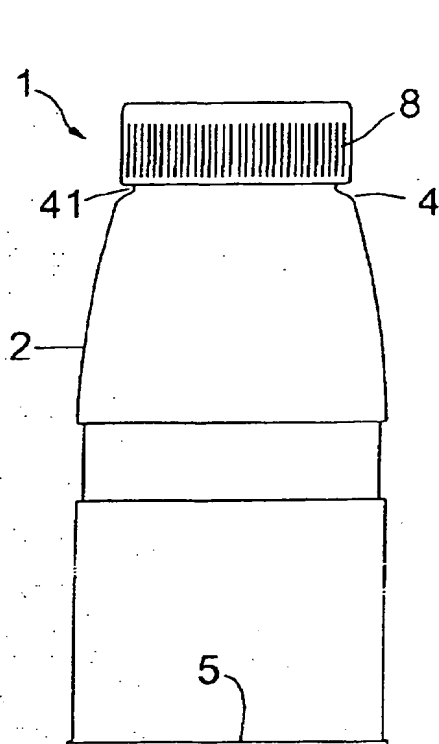


FIG. 1

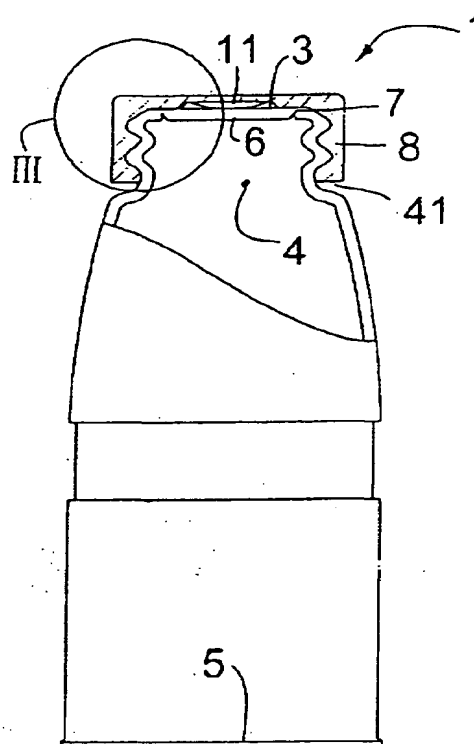


FIG. 2

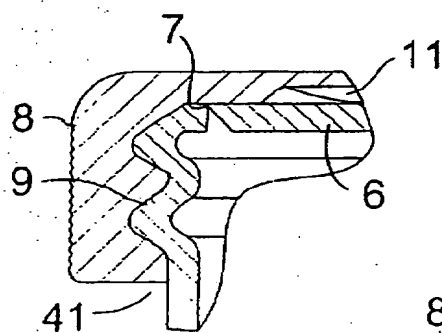


FIG. 3

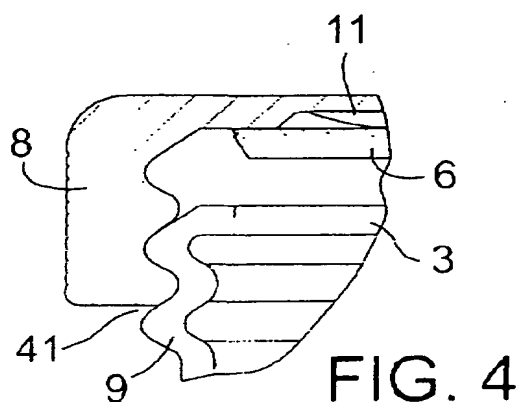


FIG. 4

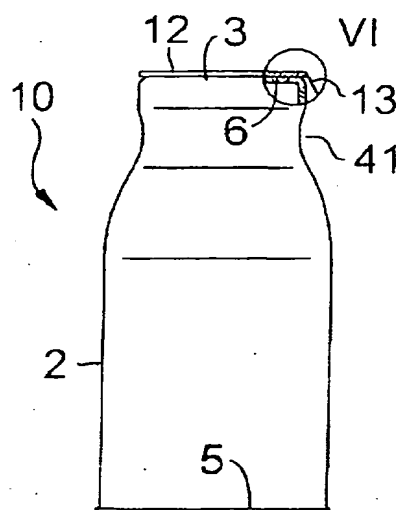


FIG. 5

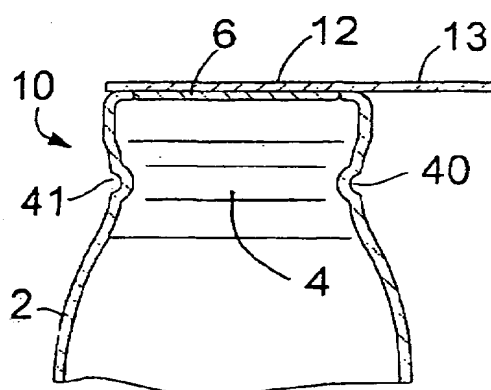


FIG. 8

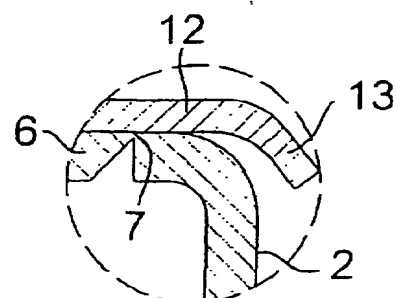


FIG. 6

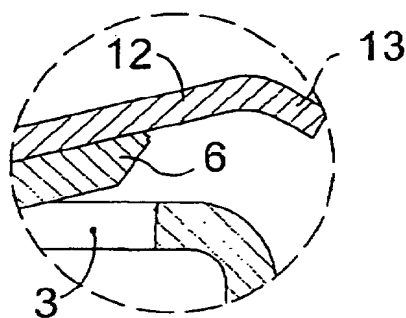


FIG. 7

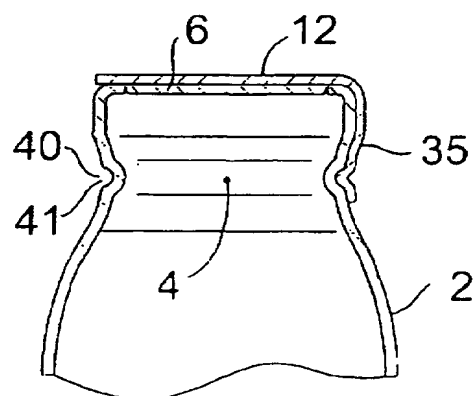


FIG. 9

FIG. 10

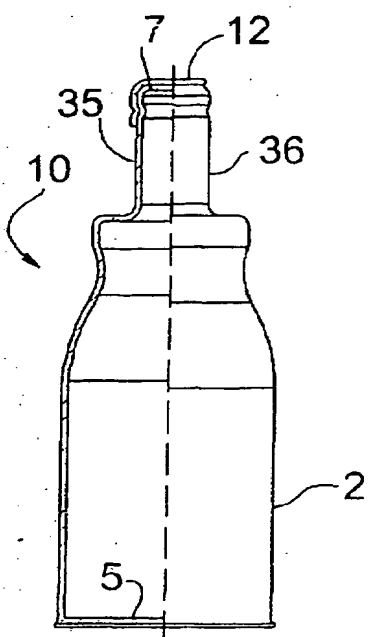
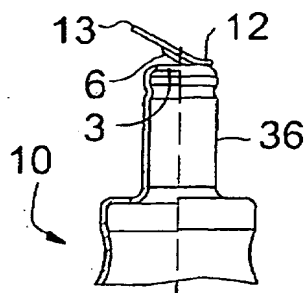


FIG. 11

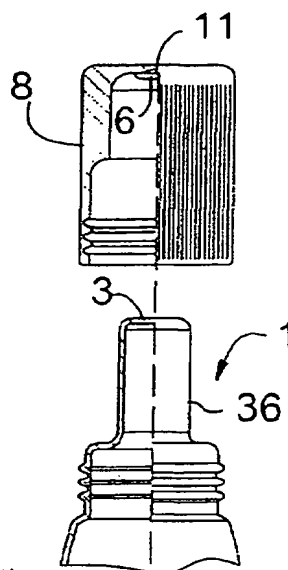


FIG. 12

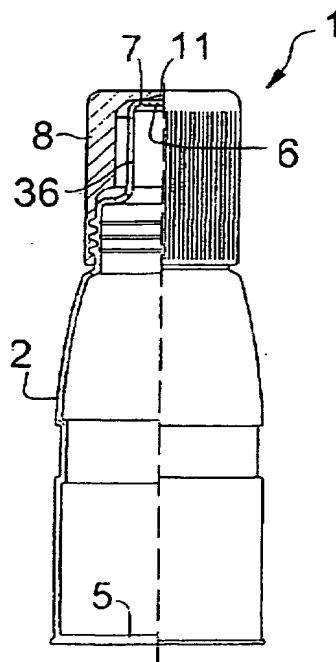


FIG. 13

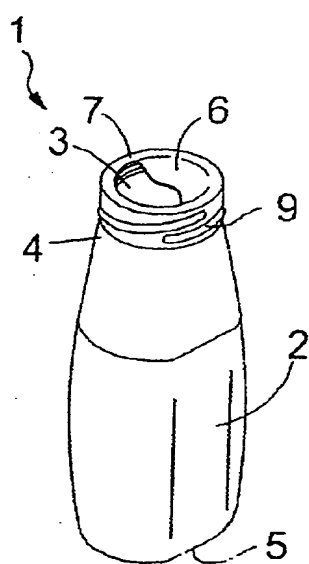


FIG. 14

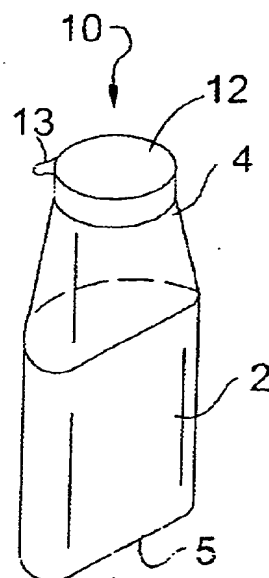


FIG. 15

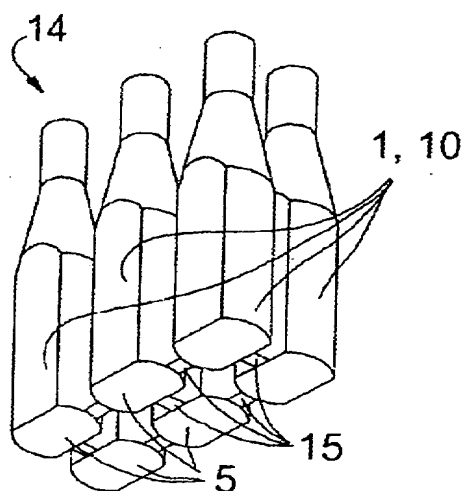


FIG. 16

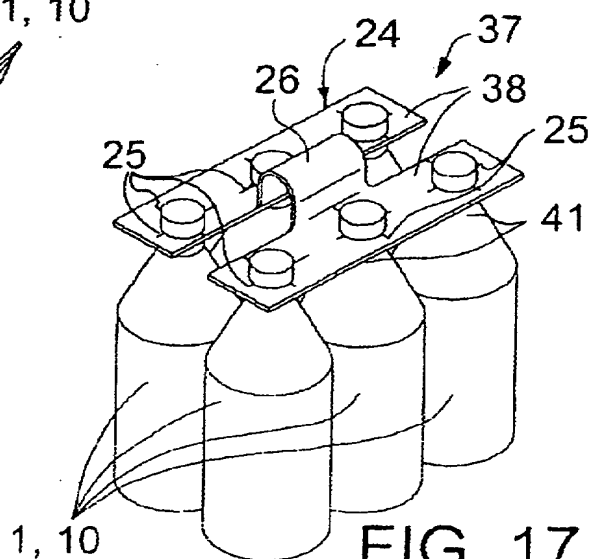


FIG. 17

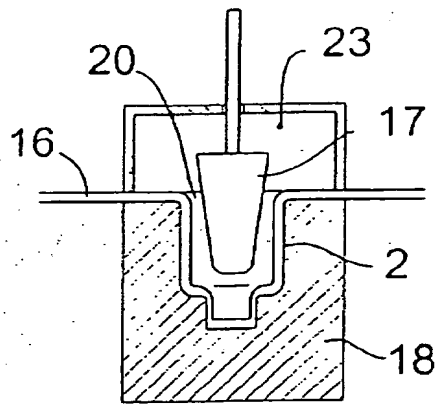


FIG. 18

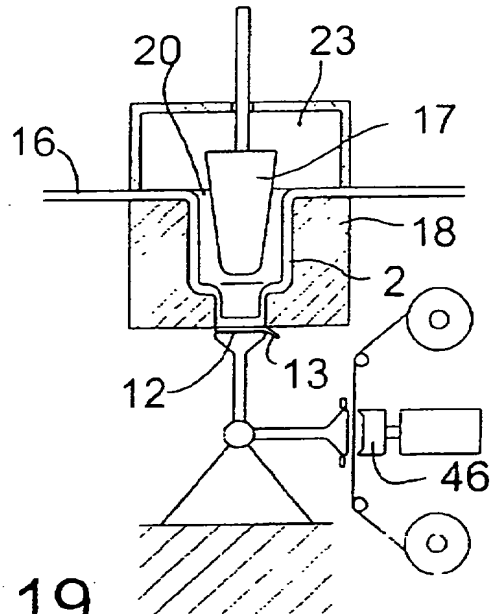


FIG. 19

FIG. 20

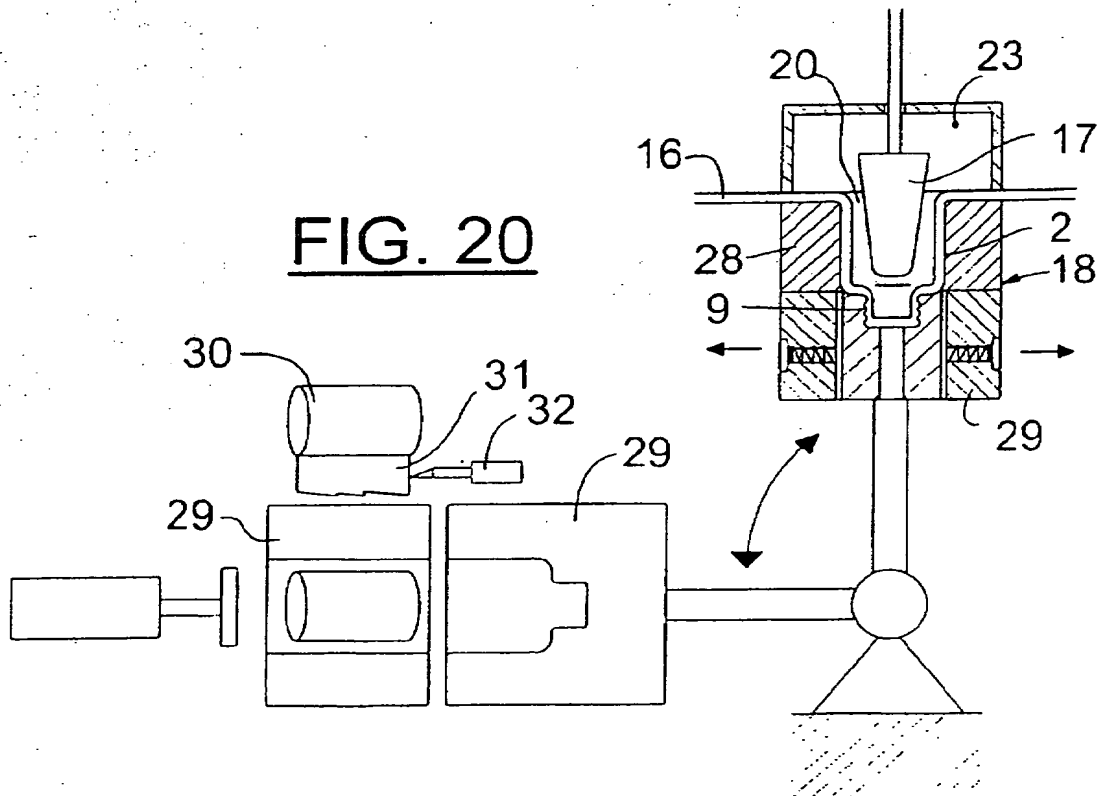


FIG. 21

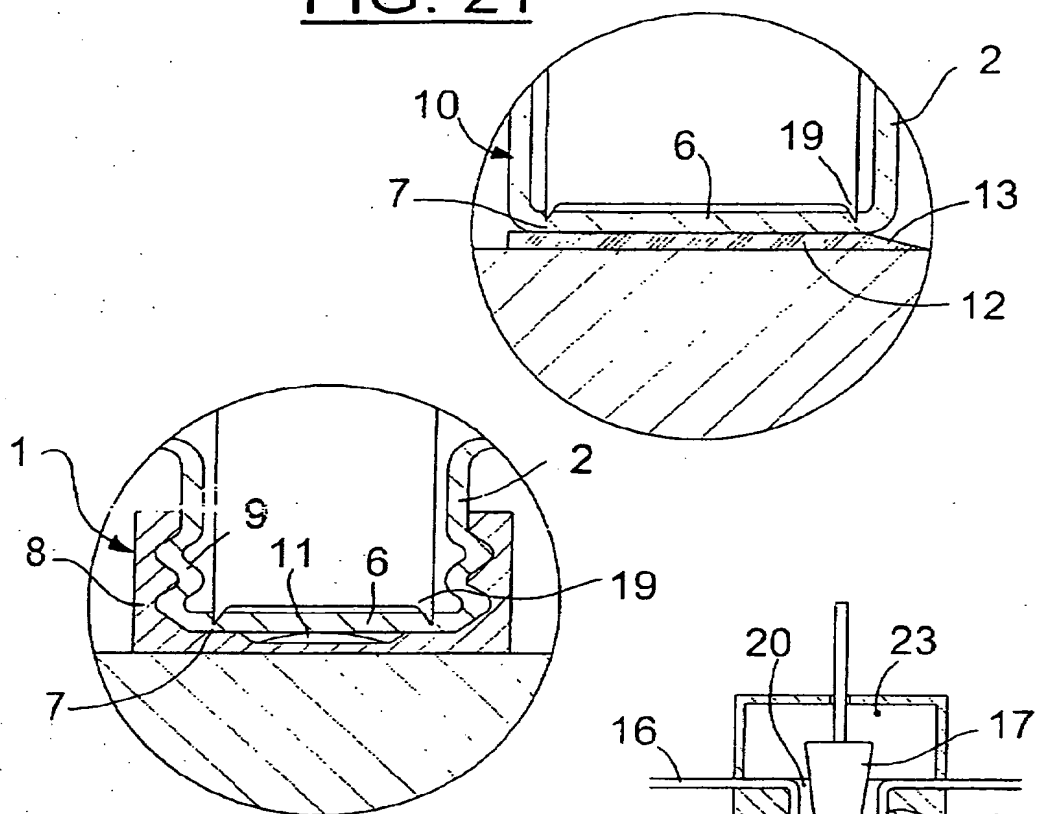


FIG. 22

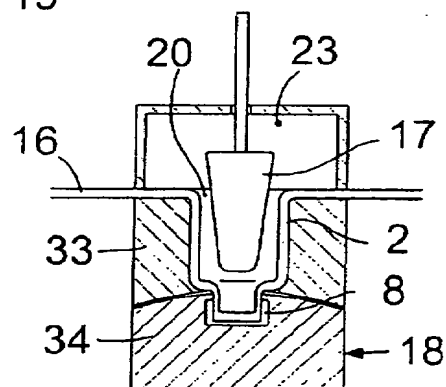
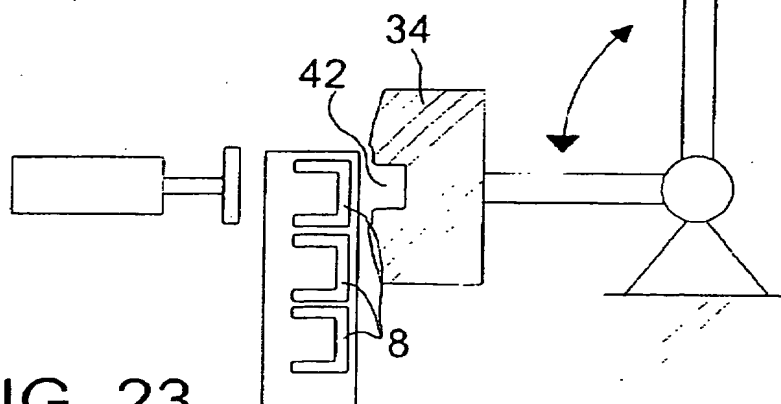


FIG. 23



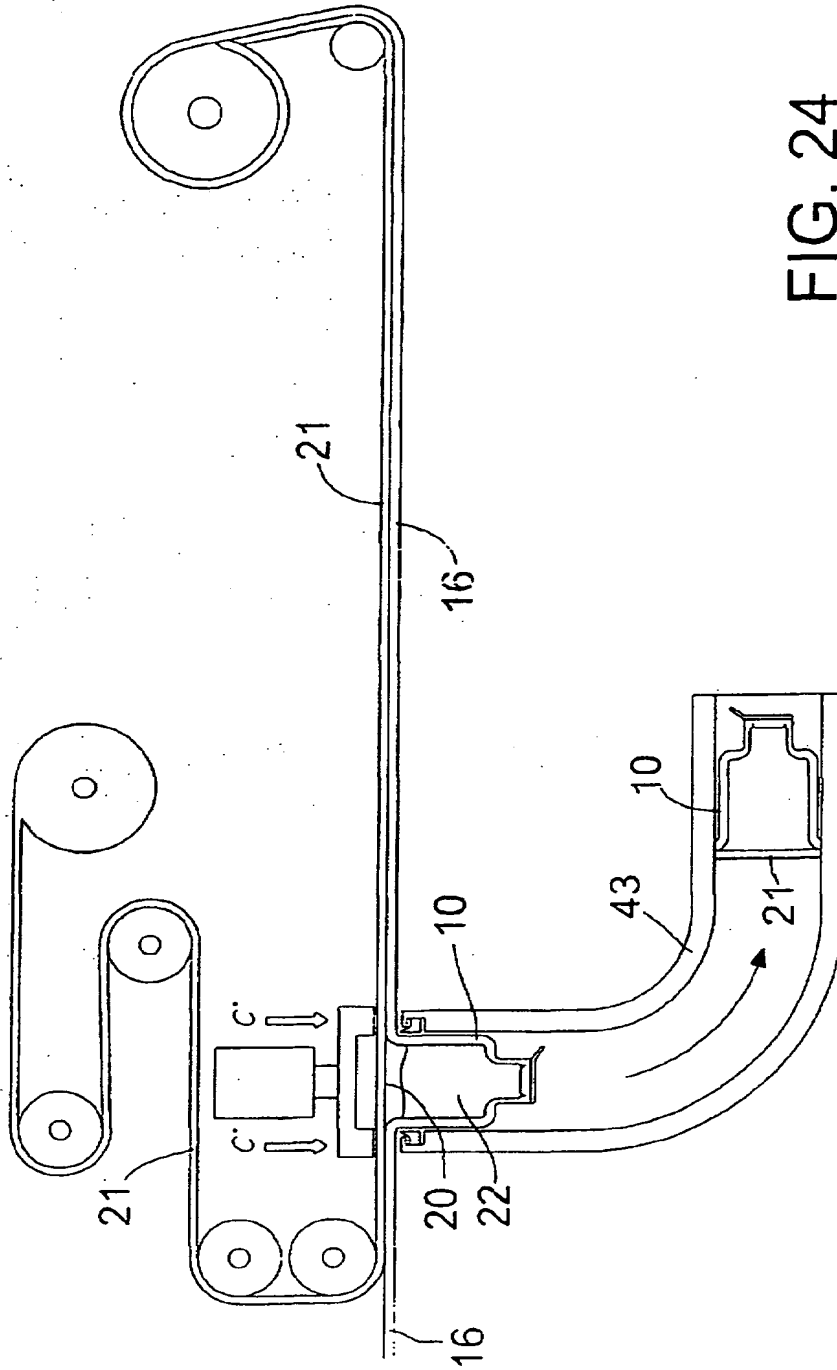


FIG. 24

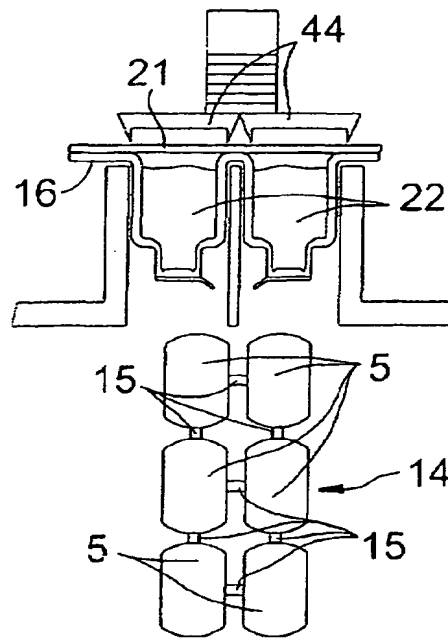


FIG. 25

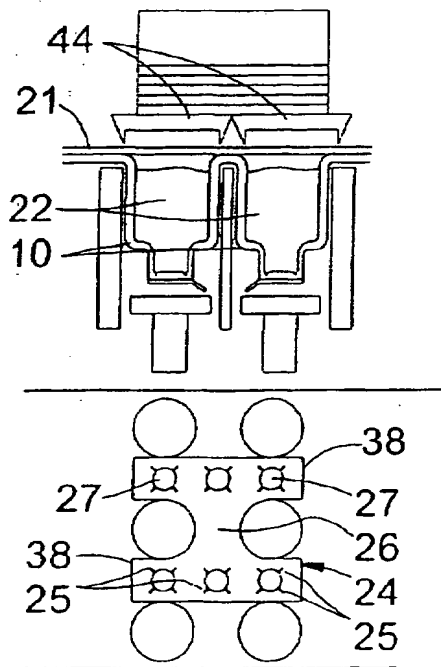


FIG. 26

(19)



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(11)

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(12)

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(30) Priority: **12.04.2000 ES 200000946**

(71) Applicant: **Crystall Fosc, S.L.**
08028 Barcelona (ES)

(54) **Bottle of thermoplastic material and method for the manufacture and filling of same**

(57) The bottle is of a single-piece and comprises a main body (2) with a hermetically closing part (6) delimited by a weakening (7) of the material adjacent to the periphery of the mouth. The bottom part is constituted by a sheet of a thermoplastic material joined to the bottle body by thermowelding. The bottle is closed with a screw-on-cap (8), or a top (12), which are joined to the closing part (6) by means of an adhesive or glue (11).

The method comprises the stages of feeding a thermoplastic laminate to a thermoforming machine; heating the laminate to a predetermined temperature; inserting a preformed punch (17) into a negative mould (18) of the bottle (1), situated in inverted position, with the laminate (16) interposed between the punch and the mould; conforming the body (2) of the bottle by means of pressure or pneumatic vacuum; forming the weakening (7) and the closing part (6) by means of a punch (19); filling the bottle with the product (22) to be contained therein, by the upper opening (20) which will later be the bottom part of the bottle; and thermal weld a laminate (21) of thermoplastic material to the periphery of the said upper opening, determining the bottom part or base and the bottle, being therefore, finished and hermetically sealed.

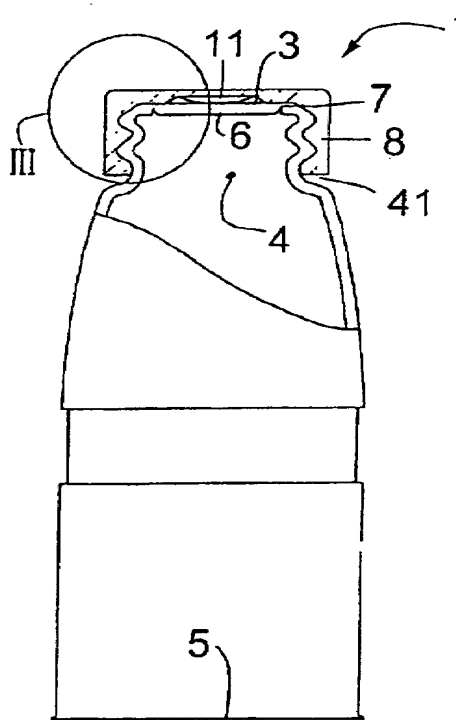


FIG. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 01 50 0075

DOCUMENTS CONSIDERED TO BE RELEVANT			
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Y	* page 1, line 38 - line 48 * * page 1, line 64 - line 67 * * page 1, line 83 - line 85 * * figures *	2	
Y	US 5 562 226 A (VALYI EMERY I ET AL) 8 October 1996 (1996-10-08) * column 4, line 46 - line 67 * * column 5, line 13 - line 22 * * figures 7,8 *	2	
A	FR 2 717 774 A (ERCA) 29 September 1995 (1995-09-29) * page 10 - page 11 * * figure 5 *	1,7	TECHNICAL FIELDS SEARCHED (Int.Cl.7) B65D B65B B29C
A	US 3 977 153 A (SCHRENK WALTER J) 31 August 1976 (1976-08-31) * column 6, line 46 - line 66 * * figure 4 *	7	

-The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 5 June 2003	Examiner Rodriguez Gombau, F
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European Patent
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Application Number

EP 01 50 0075

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:
- 1,2,7-10,12



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**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
EP 01 50 0075

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1, 2, 7-10, 12

Bottle of thermoplastic material with means for unscrewing the top, and method of manufacturing such a bottle.

2. Claims: 1, 3, 4, 7, 11

Bottle of thermoplastic material with means for pulling the top.

3. Claims: 1, 5, 14

Grouping of bottles linked by easily-broken straps, and method of creating such a grouping.

4. Claims: 1, 6, 13

Grouping of bottles linked by a body comprising a handle, and method of creating such a grouping.

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 01 50 0075

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